Borehole Data Wrangling for Stratigraphic Interpretation and 3-Dimensional Visualization
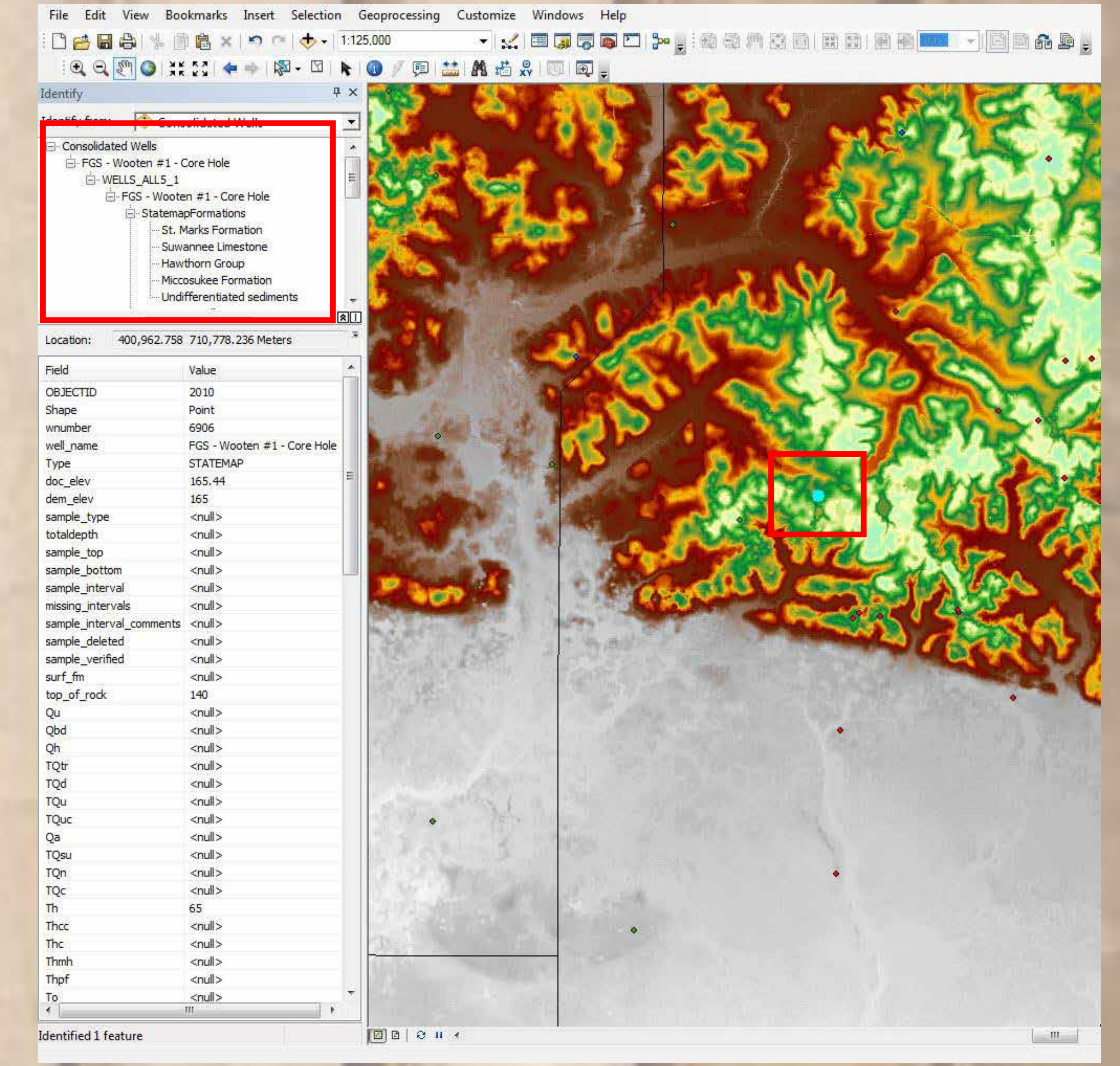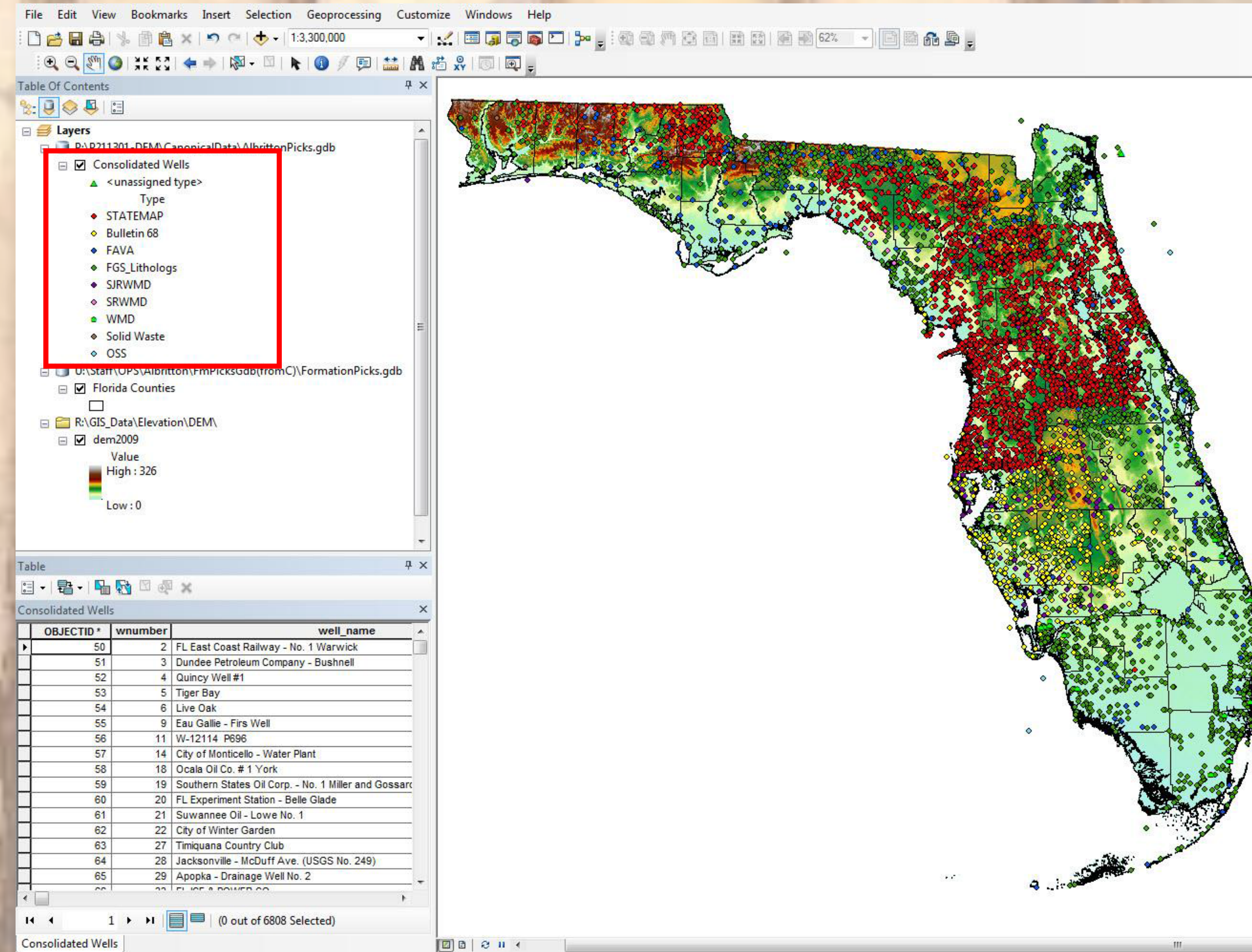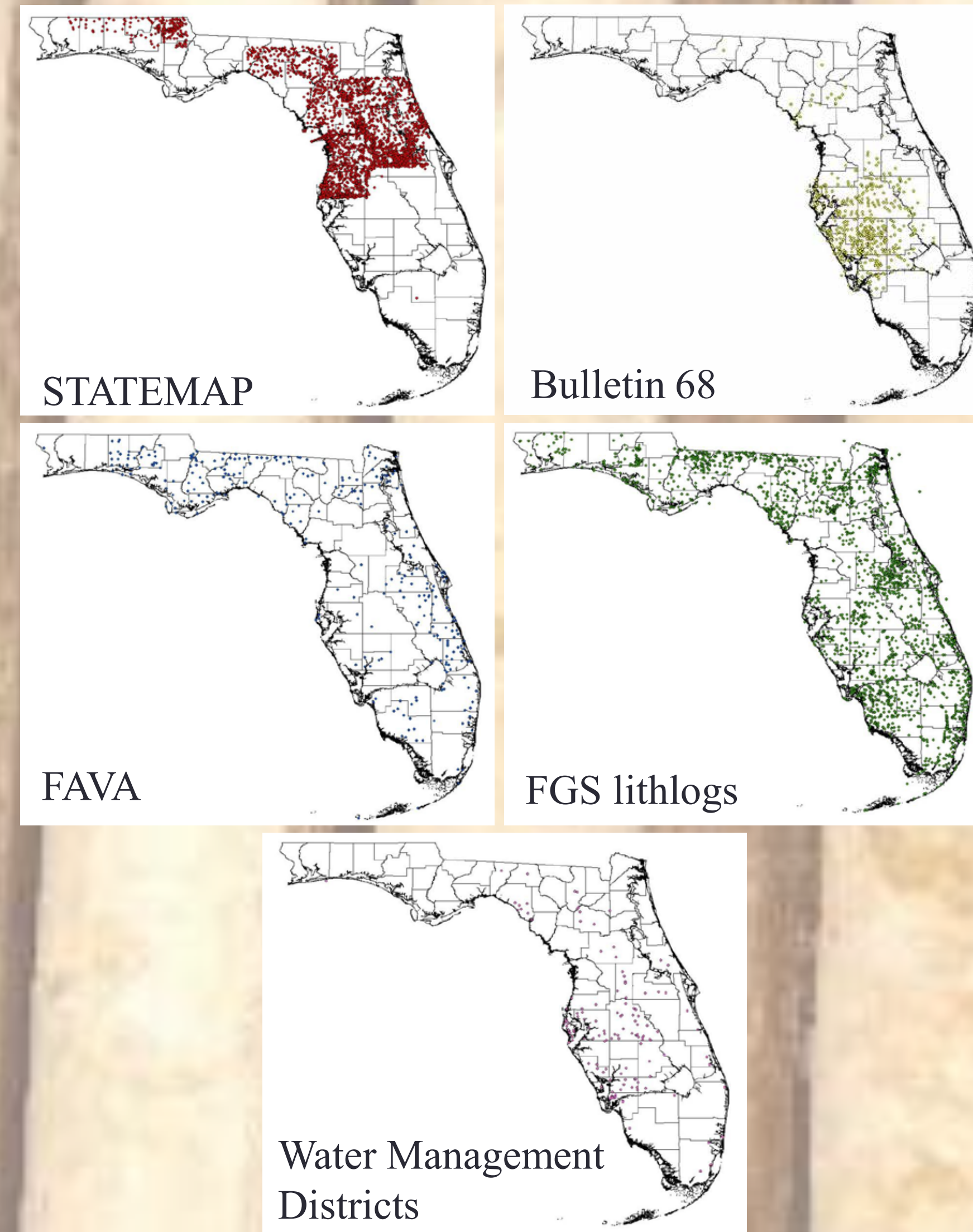
Casey Albritton, Seth Bassett, Jim Cichon, and Scott Miller
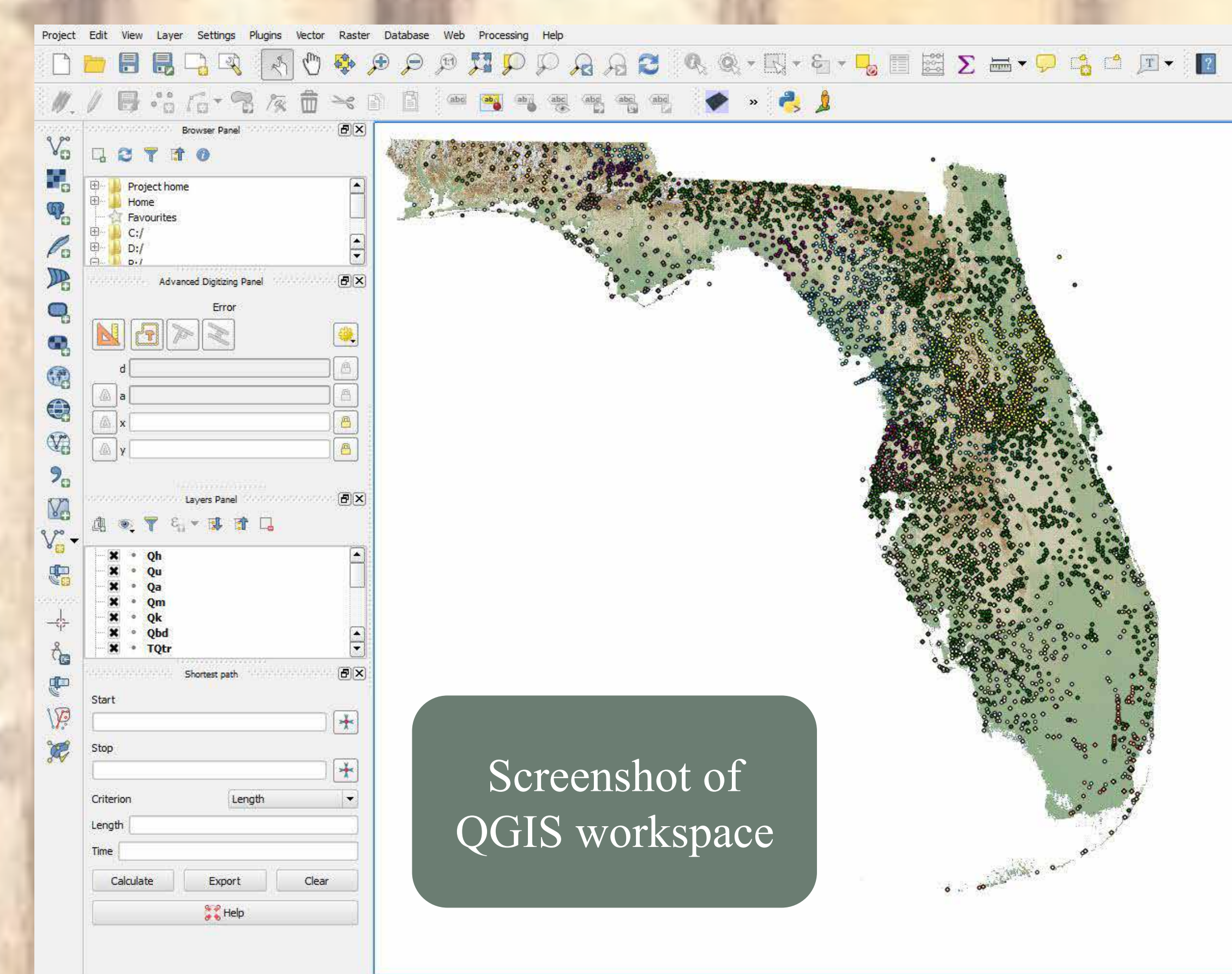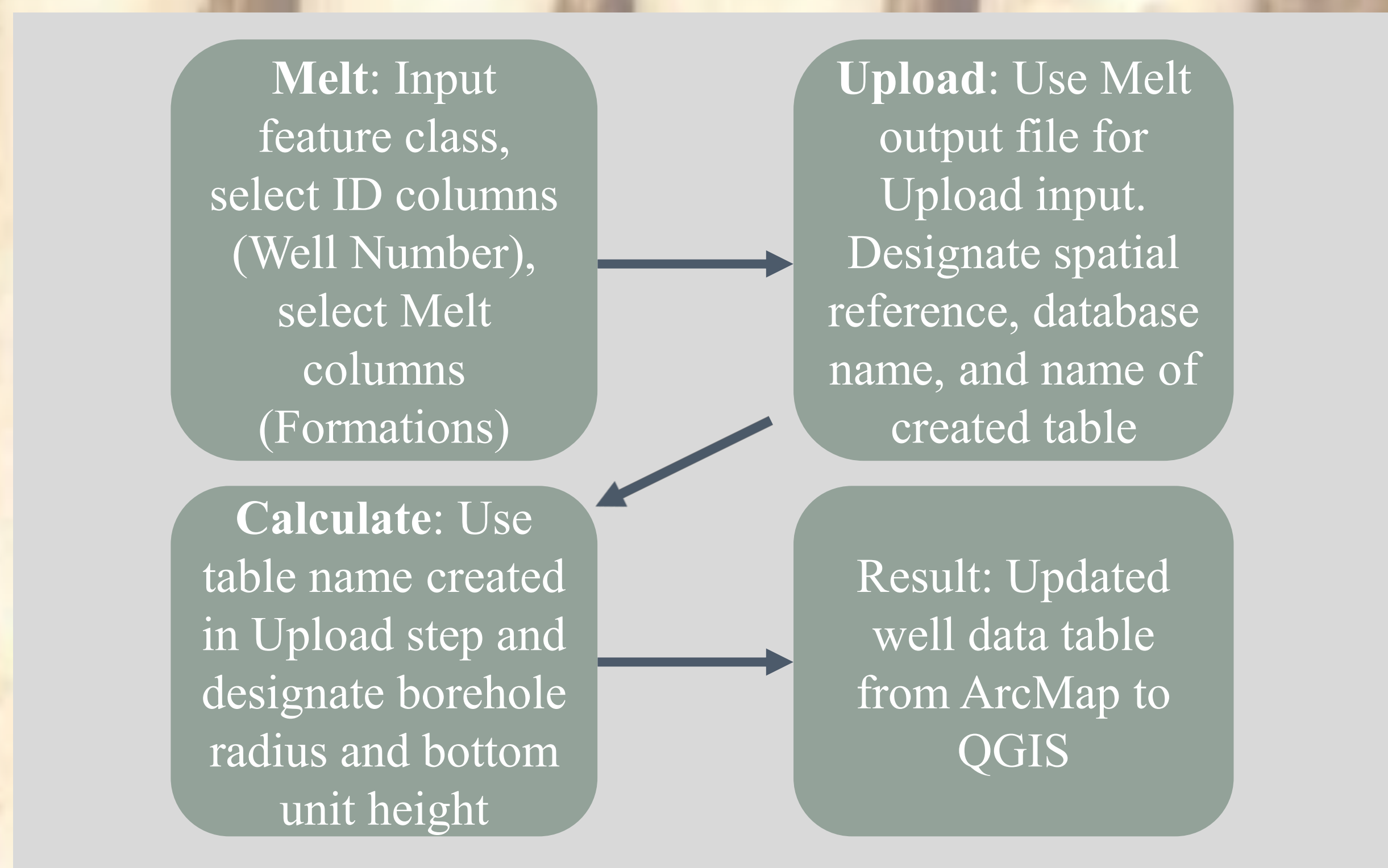
FLORIDA GEOLOGICAL SURVEY · EST. 1907

Introduction

The mission of the Florida Geological Survey (FGS), established in 1907, is to collect, interpret, and provide objective quality geologic information about Florida. Statewide borehole data are essential in accurately describing, visualizing, and characterizing the subsurface formations that comprise Florida's geology. Here, we highlight one of the many ways in which FGS has taken these data, which have been collected throughout many years of study, and compiled the formation picks into one ArcGIS feature class. Having these data consolidated for the first time statewide into one easily viewable feature class means that they can be used in a variety of ways to answer questions about the accuracy of the data, well-sample location, and stratigraphic relationships. The data are then translated into a form that Quantum GIS (QGIS) can understand, enabling for the first time a statewide 3D rendering of Florida's borehole data.

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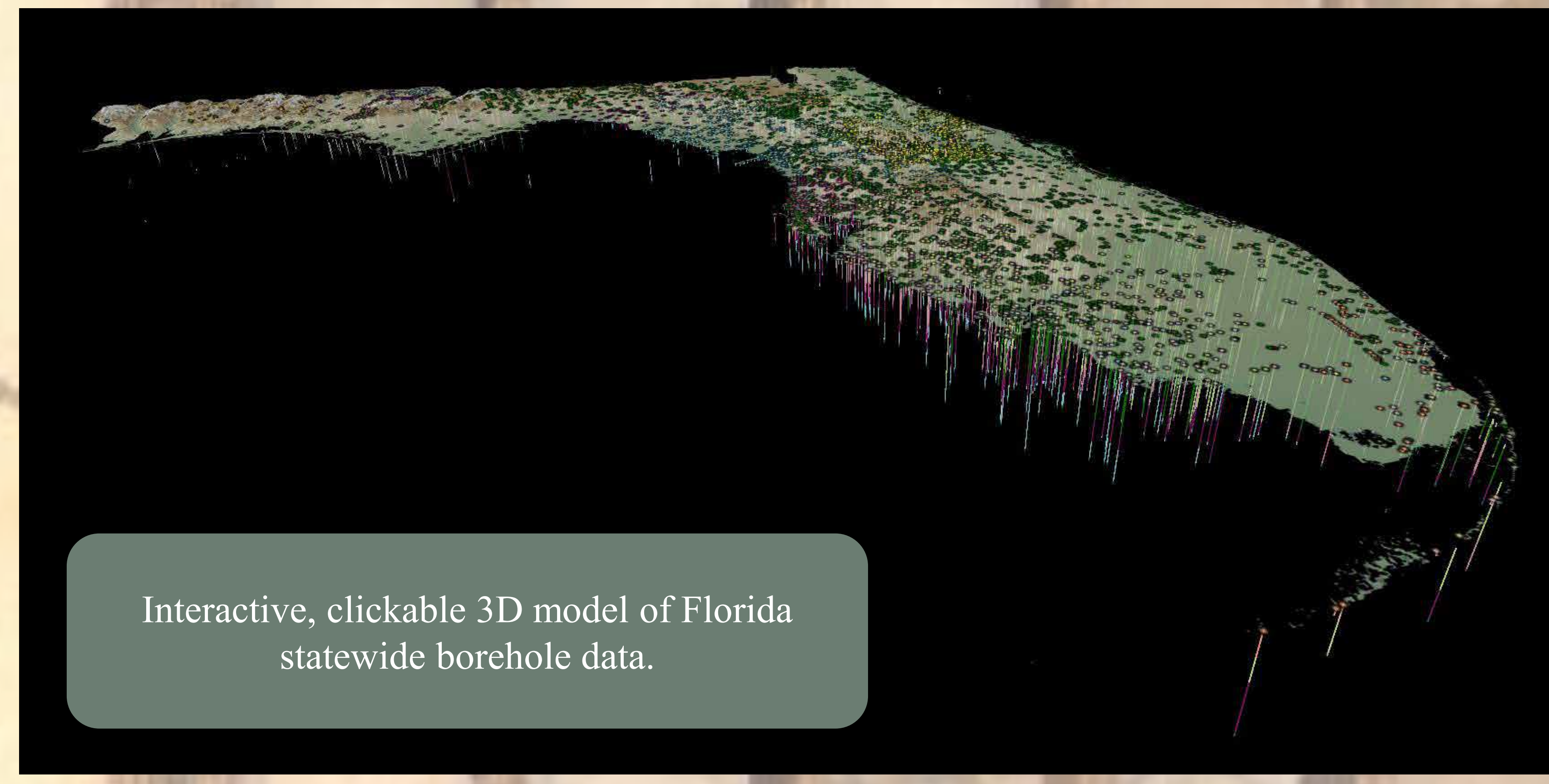FAVA

FGS lithlogs

Water Management Districts

Gather data from multiple sources; format tables the same

Merge multiple feature classes with matching fields into one feature class for a total of 6808 wells with formation picks

Create relationship classes to link data sources to provide a digital "bread-crumb trail" to original data

Melt: Input feature class, select ID columns (Well Number), select Melt columns (Formations)

Upload: Use Melt output file for Upload input. Designate spatial reference, database name, and name of created table

Calculate: Use table name created in Upload step and designate borehole radius and bottom unit height

Result: Updated well data table from ArcMap to QGIS

Screenshot of QGIS workspace

Interactive, clickable 3D model of Florida statewide borehole data.

Convert ArcMap feature class to QGIS format using Python Toolbox: Melt, Upload, and Calculate used sequentially to translate FGS well picks from wide to long format and upload to Post GIS

Set up data in QGIS for model run: link QGIS to QGgis2threejs plugin, add in formation layers, symbolize the different units, and add DEM layer to use as land surface. Zoom to an area of interest and run plugin Qgis2threejs